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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/560,840	12/15/2005	Gonzalo Lucioni	2003P07069WOUS	6893

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SIEMENS CORPORATION
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EXAMINER

PULLIAS, JESSE SCOTT

ART UNIT	PAPER NUMBER
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2626

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/560,840	Applicant(s) LUCIONI, GONZALO	
	Examiner JESSE S. PULLIAS	Art Unit 2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 15-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 15-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 December 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/15/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: Page 1, lines 21-24 contain incorrect grammar. Appropriate correction is required.

Claim Objections

2. Claim 16 is objected to because of the following informalities: "first and second coefficient changing" is incorrect grammar. For the purposes of examination, the claim will be interpreted to read "first and second coefficient change". Appropriate correction is required.
3. Claim 17 is objected to because of the following informalities: "changing" is incorrect grammar. For the purposes of examination, the claim will be interpreted to read "changes". Appropriate correction is required.
4. Claim 22 is objected to because of the following informalities: "wherein the merge unit merging the outputs" is incorrect grammar. For the purposes of examination, the claim will be interpreted to read "wherein the merge unit merges the outputs".

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 32 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Claim 32 recites the limitation "the subsection" in 1. There is insufficient antecedent basis for this limitation in the claim. For purposes of examination, "the subsection" will be interpreted as "a subsection".

Claim Rejections - 35 USC § 101

7. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 27-32 are rejected under 35 U.S.C. 101 because they are directed to non-statutory subject matter.

Claims 27-32 define non-statutory processes because they merely manipulate an abstract idea (mathematical algorithm). The disclosed invention has a practical application in the technological arts (e.g. audio compression/expansion); however, the claimed process, a series of steps to be performed on a computer, simply manipulates a mathematical algorithm without any concrete tangible result and does not have any post or pre-computer process activity.

A review of application 10/560,840 shows the disclosed invention thereof to be an apparatus/device and method for compressing/expanding audio. This is a practical application within the technological arts. However, it does not disclose specific

hardware, specific software, or a combination thereof for performing the claimed functions.

The functional blocks of Figures 2-4 represent the claimed "units" recited in claims 15-26; however, they are described in the specification as blocks implementing a mathematical algorithm, not as physical components or circuits. No more specific disclosure of the claimed "units" is set forth, i.e. no computer program, no logic circuits. In the instant application the disclosure is directed to any and every structure for carrying out the claimed functions, and not solely to specific structure. Claims 27-32, reviewed in light of the specification, simply recite a mathematical algorithm for performing time scale compression and expansion of a sequence of samples.

As can be seen by claims 15-32, these claims recite directly a mathematical algorithm by setting forth the steps of "Specifying a working cycle... generating ... a time-staggered sub sequence ... merging ...etc... These steps are mathematical in nature.

Reviewing the claims, we have a field of use limitation at the claim 15 preamble "A method for the temporal expansion or compression of a sequence of audio samples." This limitation does not in any way further limit the algorithm because the recital is merely a field of use or desired end use limitation. A mathematical algorithm is not made statutory by "attempting to limit the use of the formula to a particular technological environment." Diehr, 450 U.S. at 191, 209 USPQ at 10. Thus, a "field of use" or "end of use" limitation in the claim preamble is insufficient to constitute a statutory process.

The above review of the claims shows that the subject matter claimed in addition to the mathematical algorithm is not sufficient on its own to render the claims as a whole statutory.

Further, a review of each claim as a whole fails to show the transformation or reduction of subject matter to a different state or thing. The sequence of samples, a set of numbers, is merely mathematically processed to produce another set of numbers, a sub-sequence.

Applicant should also note that claimed steps directed to, for example, compression/expansion of audio signal, (i.e. if the steps of compressing audio are positively recited in the base claims), would be considered to be statutory subject matter.

It is readily apparent that when claims 27-32 are each taken as a whole, the claims are directed to the preemption of a mathematical algorithm, and thus are non-statutory.

Claims 15-26 and 33 are statutory because they recite in addition to the mathematical algorithm a control unit and a memory unit connected to the input for receiving the sequence of numbers (see Fig 1).

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 15-17, 20, 21, 2-30, 32, and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by Lin (6,252,919).

Consider claims 15 and 27, Lin discloses a device for the temporal expansion or compression of a sequence of audio samples in a data transmission network, comprising:

an input for receiving the sequence of samples of a signal (**Col 3 lines 6-7**, input stream of samples);

a memory unit operatively connected to the input stores the samples (**Col 3 lines 11-13**, a buffer receives the samples from the input stream);

a control unit that cyclically (**Col 3 lines 60-64**, the converter operates in read/write cycles) controls the temporal expansion or compression based on a conversion factor specifying a number of samples to delay (**Col 3 lines 17-21**, delay register delays samples by a period of the derived clock);

a working cycle having a predetermined number of working steps for processing a sub-sequence of the sequence of samples (**Col 3 lines 17-21**, read/write cycle, and **Col 5 lines 7-52** show the working steps for processing, for example, 8 samples);

a delay unit operatively connected to the input memory, the delay unit references the sample to be processed in one of the number of working steps, determines a delayed sample from the memory unit that has been delayed by the number of samples

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to delay in comparison to the sample to be processed (**Col 3 lines 42-45**, delay register delays samples, the step is shown in **Col 5 lines 12-25**, IN+DELAY has been delayed DELAY number of samples compared to IN);

a filter unit (**Col 3 lines 28-30**, filter stage), comprising:

a first multiplication unit operatively connected to an output of the memory unit and to a first coefficient unit providing a first coefficient in accordance to a first coefficient function, the first multiplication unit providing an output of the product of the output of the memory unit and the first coefficient (**Col 5 lines 26-35**, $7/8^{\text{th}}$, then $6/8^{\text{th}}$ etc. show the coefficient function, which is multiplied by IN sample X_i), and

a second multiplication unit operatively connected to an output of the delay unit and to a second coefficient unit providing a second coefficient in accordance to a second coefficient function, the second multiplication unit providing an output of the product of the output of the delay unit and the second coefficient (**Col 5 lines 26-35**, $1/8^{\text{th}}$, then $2/8^{\text{th}}$ etc. show the coefficient function, which is multiplied by IN+DELAY sample X_i); and

a merge unit merging the outputs of the first and second multiplication units, wherein the first and second coefficients have a value between zero and one (**Col 5 lines 47-52**, see above, the coefficients are fractions, the IN and IN+DELAY streams are combined).

With respect to claims 16 and 30, Lin discloses the first and second coefficient change in time (**Col 7 lines 22-24**, fades in or fades out over many sample periods, **Col**

7 lines 43-46, weighting factors A and 1-A are generated) and wherein the square of the first coefficient plus the square of the second coefficient equals one (**Col 8 lines 12-13**, A is set to 0 so A-1 is one).

With respect to claim 17, Lin discloses wherein the first coefficient starts with 1 at the beginning of the working cycle (**Col 8 lines 12-13**) and changes in accordance to the first coefficient function wherein first coefficient changing linearly (**Col 5 lines 26-34**, it linearly progresses down to $1/8^{\text{th}}$ for example) or in accordance with a sigmoid function.

With respect to claim 20, Lin discloses the sub-sequences including at least fifty eight percent of all the samples of a sequence (**Col 5 lines 7-10**, dependent on the sequence length $m=8$ samples can be at least fifty eight percent).

With respect to claim 21, Lin discloses the processed sub-sequences including less than half of all the samples of a sequence (**Col 5 lines 7-10**, dependent on the sequence length $m=8$ samples can be less than half).

With respect to claim 26, Lin implicitly discloses the expansion or the compression is less than 20 percent (**Col 9 lines 36-38**, varying slightly in frequency implies compression or expansion less than 20 percent is needed).

With respect to claim 28, Lin discloses prior to merging the sub-sequence and the time-staggered subsequence the sub-sequence is filtered or the time-staggered sub-sequence is filtered (**Col 3 lines 28-41**, filter stage receives samples in the faded stream).

With respect to claim 29, Lin discloses the filter includes a first coefficient function and a second coefficient function (**Col 6 lines 38-49**, weighting function coefficients are complementary functions), the coefficient functions changing over time in accordance with a linear function (**Col 5 lines 26-34**, it linearly progresses down to $1/8^{\text{th}}$ for example) or a sigmoid function.

With respect to claim 32, Lin discloses a subsection includes less than one third of the working steps of a working cycle (**Col 5 lines 7-52**, a read operation, for example, is a subsection since it is one of the steps and the process has more than 3 steps in the working cycle).

With respect to claim 33, Lin discloses association with a device selected from the group consisting of a receiver unit of a data transmission network, a transmitter unit of a data transmission network, a music reproducing device, a dictating machine, a voice output unit and combinations thereof (**Col 1 lines 14-15**, digital audio system in a PC).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (6,252,919) in view of Yoshida et al (5,687,240).

With respect to claim 18, while Lin discloses filter, Lin does not specifically mention a time-variant attenuator filter connected down stream from the merge unit.

Yoshida et al. discloses a time-variant attenuator filter (**Abstract lines 1-3**).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of Lin by including a time-variant attenuator filter connected down stream from the merge unit in order to provide smoother and higher quality sound signals, as suggested by Yoshida (**Col 10 lines 50-54**).

With respect to claim 19, Lin discloses at least six audio units of approximately 30 ms are processed in a working cycle (**Col 5 lines 8-9**, 256 samples can approximate 30 ms depending on sampling rate).

12. Claims 22-24 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (6,252,919).

With respect to claims 22 and 31, Lin discloses a delay unit, multiplication units, and a merge unit **(See claim 15)**. Lin does not specifically mention an additional delay unit operatively connected to the input memory, the additional delay unit determining a delayed sample twice that of the first delay unit, and an additional multiplication unit operatively connected to an output of the additional delay unit and to an additional coefficient unit providing an additional coefficient in accordance to a additional coefficient function, the additional multiplication unit providing an output of the product of the output of the additional delay unit and the additional coefficient, wherein the merge unit merges the outputs of the first, second, and additional multiplication units.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of Lin by including the additional delay unit determining a delayed sample twice that of the first delay unit, and an additional multiplication unit operatively connected to an output of the additional delay unit and to an additional coefficient unit providing an additional coefficient in accordance to a additional coefficient function, the additional multiplication unit providing an output of the product of the output of the additional delay unit and the additional coefficient, wherein the merge unit merges the outputs of the first, second, and additional multiplication units in order to merge three signals of different sampling rates instead of two, as suggested by Lin **(Col 1 lines 20-25)**.

With respect to claims 23, Lin discloses the second coefficient function equals a second auxiliary function minus the product of a third auxiliary function and the first coefficient function (**See claim 15**. The second function may be viewed as $1 - 1 \cdot \text{first function}$, so $y[n] = 1$ is a third auxiliary function),

Lin does not specifically mention wherein the additional coefficient function equals the product of the negative of the second auxiliary function and the third auxiliary function.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of Lin to include an additional coefficient function equals the product of the negative of the second auxiliary function and the third auxiliary function, in order to weight a third signal for merging three signals, for reasons similar to those of claim 22.

Consider claim 24, While Lin discloses the sum of the first and second coefficient functions is one (**Col 5 lines 26-35**), Lin does not specifically mention additional coefficient functions.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of Lin by including a additional coefficient functions, the sum of the first, second and additional coefficient functions is equal to one in order to avoid amplitude scaling of the signal during merging three or more signals, for reasons similar to those of claim 22.

13. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (6,252,919) in view of Takeuchi et al (5,432,296).

With respect to claim 25, while Lin discloses a filtering stage, Lin does not specifically mention an all-pass with the following transmission function $H(z) = (z^{-N} + \gamma) / (1 + \gamma * z^{-N})$ where H is the transmission function and γ determining a delay and γ has the value 0.5 or a value greater than 0.5.

Takeuchi et al. discloses an all-pass with the following transmission function $H(z) = (z^{-1} + a) / (1 + a * z^{-1})$, (**Col 2 eq. 1**, with $N=1$ and $a=\gamma$ is the same as the claimed transfer function). Takeuchi further teaches the coefficient “a” can be changed to change the delay, implying that a can be 0.5 or greater (**Col 4 lines 23-26**).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of Lin by using an all-pass with the transmission function disclosed by Takeuchi, in order to control the delay of the signal, as suggested by Takeuchi (**Col 4 lines 23-26**).

Conclusion

1. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. 6,944,510 Ballesty et al. discloses time scale modification of an audio signal by synchronous overlap addition

- b. 5,920,840 Satyamurti et al. disclose a speaker dependent time-scaling technique for voice signals detecting a pitch value
 - c. 5,920,842 Cooper et al. disclose signal synchronization by adding or subtracting the wavelength of a signal
2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jesse Pullias whose telephone number is 571/270-5135. The examiner can normally be reached on M-F 9:00 AM - 4:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Hudspeth can be reached on 571/272-7843. The fax phone number for the organization where this application or proceeding is assigned is 571/270-6135.
3. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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